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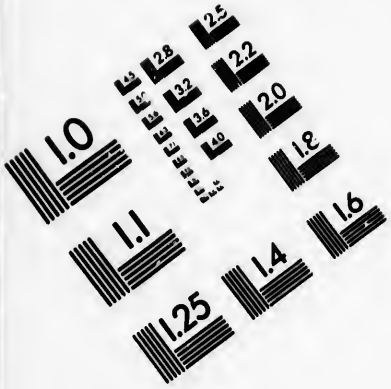

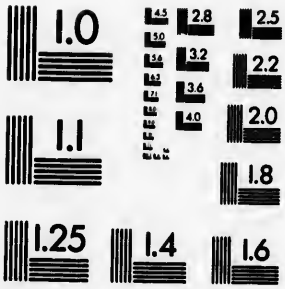

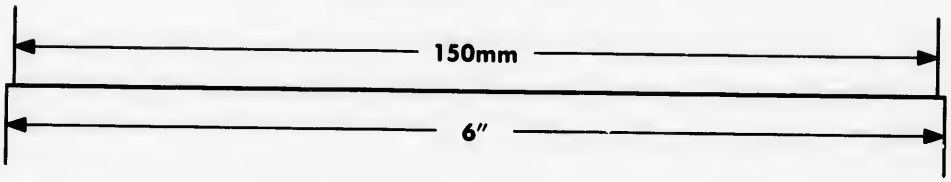

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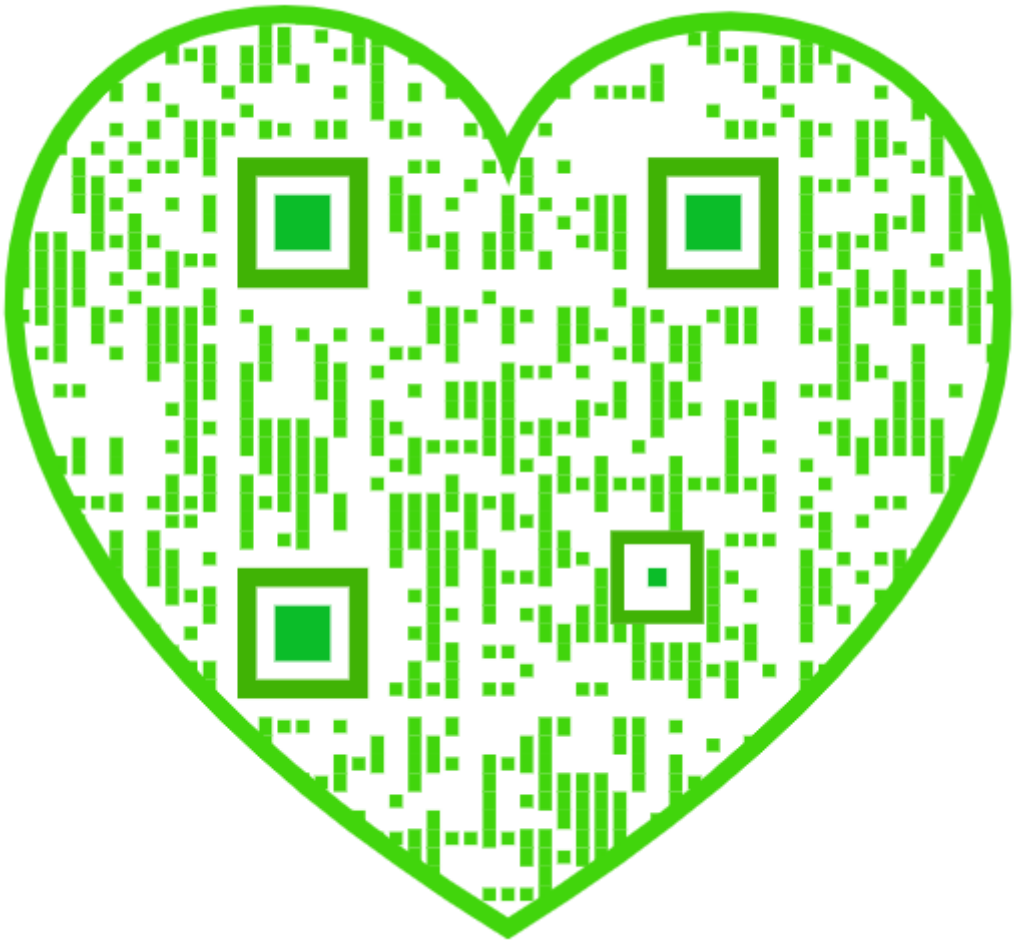

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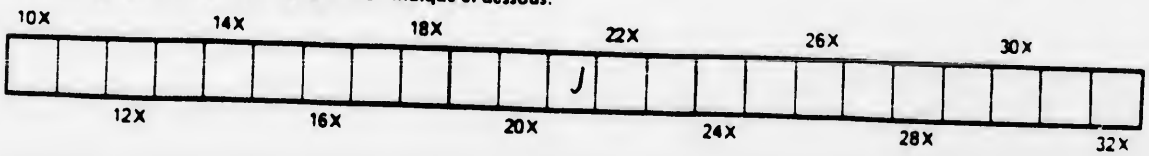

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ONTARIO AGRICULTURAL COLLEGE

DAIRY DEPARTMENT.

BULLETIN LXXXVIII.

THE MAKING OF CHEESE.

BY THE SPECIAL DAIRY SCHOOL.

PUBLISHED BY THE DEPARTMENT OF AGRICULTURE

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BULLETIN LXXXVIII.

THE MAKING OF CHEESE

IN SPRING, SUMMER AND FALL.

This Bulletin has been prepared by Committees of the Special Dairy School, 1893, at the Ontario Agricultural College as follows :

Spring Cheese :

A. T. Bell, Tavistock, Ont.,
(Chief Instructor in Cheese-making.)
W. W. Grant, Lakefield, Ont.
L. A. Zufelt, Morrisburg, Ont.

Summer Cheese :

A. T. Bell, Tavistock, Ont.,
(Chief Instructor in Cheese-making.)
L. Patton, Oxford Mills, Ont.
J. S. Clark, Warwick, Ont.

Fall Cheese :

T. B. Millar, Burgoyne, Ont,
(Asst. Instructor in Cheese making.)
W. Bothwell, Woodstock, Ont.
C. Stewart, Flesherton, Ont.

Care of Milk for Cheese Factories.

In order to maintain the proud distinction that Canadian cheese has already won in the British markets it is absolutely necessary that the dairymen shall put forth greater efforts than they have in the past to produce a better quality of milk. Progress must be the watchword.

The maximum of profit can be obtained only by the clear-thinking, intelligent dairyman, who breeds and feeds to produce the greatest amount of milk of a good quality at the least possible cost.

The faithful and constant observance of the following points will result in a marked improvement in the condition of the milk supplied to the cheese factories, an improvement which is much needed, and the bringing about of which will enable the cheese-maker to produce an article much superior to anything that has been made in the past, and by so doing we can maintain our supremacy in the English market, realize a better price for our goods, and add very materially to the profits of the dairyman.

Nothing but pure milk from healthy cows should be sent to the factory. To secure this, cows should have abundance of wholesome, nutritious food and pure water, with access to salt at all times.

The greatest possible care should be taken to prevent cows drinking stagnant water. Milk from such cows is invariably tainted, and no amount of skill on the part of the cheese-maker can produce from it a really fine cheese.

Immediately after the milk is drawn it should be strained, then aerated by dipping or pouring, which can be done very effectively while the milk is yet in the pails. Be sure that this work is done in a pure atmosphere, with clean surroundings, away from the stables or anything else of an impure nature, for unless this be attended to properly aeration will be a detriment instead of a benefit.

It is not necessary to cool milk at night, unless the weather be extremely hot, in order to have it in the best condition for delivery at the factory in the morning (provided all pails, utensils, strainers, etc., have been thoroughly washed, then scalded with boiling hot water and well aired before using).

It is just as important that the morning's milk should be well aired before sending it to the factory; not only in the summer should milk be aerated, but also in the spring and autumn.

The milk stands should be built in such a way as to exclude the sun and rain, and yet allow a free circulation of air around the cans.

The organisms that produce bitter or tainted milk, or any abnormal change, are to be found only where there is filth and carelessness in handling, so that in all cases when complaint is made of impure milk the remedy must be *extra cleanliness*.

Spring Cheese.

The cheese-maker who is desirous that his cheese shall be of the finest quality will accept nothing but good, pure milk. All tainted or sour milk and the first milkings (colostrum) should be refused.

Heat the milk to 84° Fahr. The rennet test should then be used to ascertain the degree of ripeness. To make this test take 8 oz. of milk from the vat, add to it one drachm of rennet extract, stir rapidly for ten seconds. If coagulation takes place in from 17 to 20 seconds the milk is sufficiently matured for the addition of rennet. A slight variation from this may be necessary to suit different localities, but a few trials will enable the maker to tell when the milk is properly ripened. A very simple way to tell the exact moment when coagulation takes place is to drop a bit of burnt match into the milk. It assumes a rotary motion when

the milk is stirred. Then count the number of seconds from the addition of the rennet until the stick ceases to move. This gives you the exact time required for the milk to coagulate.

Great care and watchfulness should be exercised at this season, as milk sours very rapidly during the early period of lactation.

Use sufficient rennet (from 3 oz. to 4 oz. per 1,000 lb.) to coagulate the milk fit for cutting in from 15 to 20 minutes. In cutting use the horizontal knife first, then the perpendicular. Begin when the curd is somewhat tender and cut slowly, with a firm, steady motion and continuously, until the cutting is completed.

Let the curd settle a few minutes to allow the surfaces to heal slightly, then stir with the hands—very gently and slowly at first—for about ten minutes. Rough handling at this time sets free a great number of small particles of curd which go off in the whey and very materially lessen the yield. Then the agitators may be put in and the steam gradually turned on. Take about 30 or 35 minutes in heating up to 98° Continue stirring about five minutes after the steam has been turned off, when the curd may be allowed to settle. Draw off a portion of the whey at this time that you may not be caught by a rapid development of acid. Then stir the curd occasionally (a common hay rake is best suited for the purpose) to prevent matting and to secure a thorough cooking of each particle of curd.

When the curd is thoroughly cooked and shows $\frac{1}{8}$ in. or less acid on the hot iron the whey should be removed. After dipping the curd should be well stirred with the hands to effectually drain off the whey before allowing it to mat. When it has become sufficiently matted cut into convenient strips (about 8 in. wide) and turn. In about 15 minutes they may be turned again and piled two deep. Turn frequently (four or five times an hour) to prevent any whey from collecting on or about the curd, and to ensure uniform ripening. The temperature should be maintained at about 94° while the breaking down process is going on, and when the curd presents a flaky appearance on being pulled apart and shows acid to about $\frac{3}{4}$ in. on the hot iron it may be milled and then aired by stirring occasionally. When it becomes soft and velvety, smells like newly-made butter, and shows some fat on being pressed in the hand, it may be salted at the rate of from $1\frac{1}{2}$ lb. to 2 lb. of salt per 1,000 lb. of milk.

The temperature when salting should not be higher than 86°. Put to press in about 15 or 20 minutes, or when the salt is thoroughly dissolved. Have the temperature at this time between 80° and 85°. Apply pressure gently at first, until the whey begins to run clear, then gradually increase. After the cheese

have been in the press about 45 minutes they may be taken out and neatly bandaged; only pure water should be used in bandaging. They should be turned again in the hoops in the morning. See that no rims or shoulders are left on the cheese, but have them neat and stylish in appearance, and of uniform size. They should be pressed for at least twenty hours before removing to curing room.

The curing room should be kept at an even temperature of about 65° or 70°, and should be well ventilated.

Summer Cheese.

The same treatment is required in handling and caring for the milk. Aeration and cleanliness should have the same careful attention.

When the milk arrives at the factory each can should be subjected to a strict examination by the cheese-maker (do not leave this to the poorest helper), to detect, if possible, and reject all bad-flavored or tainted milk. There is no excuse for having milk of this kind. What one patron can do all can do—care for it properly and have it arrive at the factory in the very best possible condition.

When the milk has been received heat it up gradually to 86°. When this has been done try it with the rennet test to ascertain the degree of ripeness. It is advisable to do this even in handling very ripe milk, for it enables the cheese-maker to know just about how fast the curd is going to work. If possible have the milk in that condition that all the whey will be drawn in from 2½ to 3 hours from the time the rennet is added, with ¼ in. acid on the curd by the hot iron test. Use enough rennet to coagulate the milk sufficiently for cutting in 30 minutes.

Start to cut a little early. Take plenty of time, and do not hash or slash the curd. Use the horizontal knife first, finishing with the perpendicular, and if the milk is over-ripe and going to work fast—as is quite often the case in hot weather—then cut the curd considerably finer. By so doing the cooking process is hastened; the cubes of curd being small they are much more easily cooked than if left the ordinary size. When the cutting is finished start to stir very gently at first, or until the curd becomes somewhat firm. Do not apply heat for 10 or 15 minutes after stirring is commenced. Heat gradually up to 96°, taking fully one-half hour to do so, unless in the case of fast working curd, which requires to be heated up as quickly as possible to ensure a thorough cooking. Continue stirring for some time after the desired temperature has been reached to prevent matting and to ensure a more uniform and thorough cooking of the curd.

Draw off part of the whey soon after the heating has been finished, and if there are any bad odors or taints draw the whey down quite close to the curd; then by keeping it stirred and airing well the flavor will be very much improved. Draw off all the whey when the curd shows ¼ in. acid by the hot iron test, and continue hand stirring until it is sufficiently dry before allowing it to mat, and when matted break or cut into convenient strips and turn it over at short intervals (about every 15 minutes) piling a little deeper each time it is turned, and never allow any whey to gather on or around it.

Grind early, or when the curd strings 1 to 1¼ in. on the hot iron. Keep it apart and well stirred and aired after grinding until ready for salting.

In the case of gassy curd, try to retain more moisture in it when the whey is drawn off by stirring less. Grind in about the usual time, and when it is partly ripe pile deep, and if the whey begins to lodge around it open the pile, allow the whey to drain off, then pile again. Continue in this way until the curd becomes velvety and buttery, when it is ready for salting. Hoop in from 15 to 20 minutes after the salt has been well stirred in.

Apply pressure very gently at first, or until the whey begins to run clear, after which it may be safely increased. In from 45 to 60 minutes the pressure may be removed, the hoops taken off, the cheese dressed neatly, and put back to press again. Apply full pressure before leaving there for the night.

Turn them in the hoops in the morning, paring off any corners or shoulders which may arise from imperfect fitting followers, putting back to press for five or six hours longer, when the cheese will be ready to take into the curing-room, which should be kept as cool as possible during summer.

We would strongly advise cheese makers to keep a record of each vat, the condition of the milk, and how it works each day. Stencil the cheese with the date when made, the number of the vat made from, and by so doing a great many difficulties may be overcome.

Fall Cheese.

After getting the milk into the vats heat up slowly to 86° or 88°. Ripen the milk well (a few seconds less than for summer cheese) before setting, and if the weather be cold better results can be obtained by using a little clean-flavored sour milk for a starter, but do not under any circumstances use thick milk.

Enough rennet should be used to cause perfect coagulation in 40 minutes.

Begin cutting with the horizontal knife and finish with the perpendicular, cutting continuously until it is finished.

After the cutting is completed the curd should be stirred slowly and gently for 10 or 15 minutes before any heat is applied, then raise the temperature gradually to 96° or 98°, taking about 45 minutes to attain the desired temperature. Dip the curd when it shows ¼ in. acid by the hot iron test, stir well until the whey has all escaped, then keep the curd warm (about 94°) and allow it to mat. When matted cut or break into convenient strips and turn over occasionally. Do not allow any whey to gather in pools on or around the curd. When it feels mellow or will show 1¼ in. to 1½ in. acid by the hot iron test it should be put through the curd mill. Stir and air well immediately after grinding. When the curd is well matured and has a silky, buttery appearance, the salt may be applied. Use at the rate of 2¾ lb. to 3¼ lb. of salt per 1,000 lb. of milk, varying the quantity to the amount of moisture in the curd. The temperature at this stage should be about 86°. The curd may be hooped and put to press in from 15 to 20 minutes after the salting is done. Apply pressure very slowly at first, and allow the cheese to remain in the press one hour before turning. Only pure warm water should be used when bandaging.

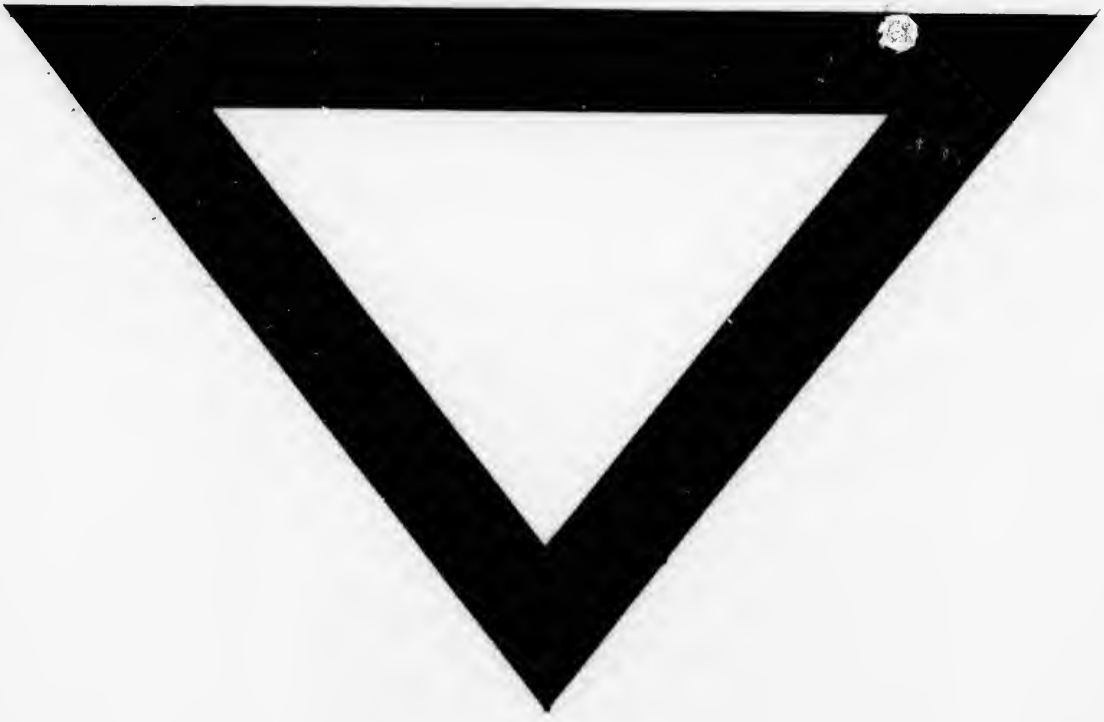
Turn the cheese in the hoops every morning, never allowing a cheese to be placed in the curing room unless it has a perfect finish.

The temperature of the curing room should be kept constantly between 60° and 65°.

When coloring pour the coloring into a dipper of warm milk from the vat, then draw the dipper quickly along under the surface of the milk from one end of the vat to the other, then stir well and there will be no danger of streaks in the curd. Have a dipper with a long handle for the purpose.

Rennet should be diluted to one gallon of pure water for each vat, and the milk should be well stirred for at least five minutes after the rennet has been added. In case the milk is very ripe two minutes will be ample time to stir after adding the rennet.

Everything in and about the factory should be kept scrupulously clean. The cheese-maker who fails to do this need not grumble if his patrons follow his example.

All strainers, sink-cloths, etc., should be well washed, then scalded and thoroughly aired each time they have been used.

The vats, pails, curd-sinks, etc., should be scalded with boiling hot water after washing, and if the water can run out readily they will dry off in a few minutes without wiping. Do not use a dish-cloth, as it usually leaves an unpleasant flavor.